Summary of Investigation Into the Occurrence of Cancer
Zip Codes 78211,78226,78227,78228, & 78237, San Antonio
Bexar County, Texas
1993-2002
February 23,2005

Background:

The Texas Cancer Registry (TCR), Texas Cancer Epidemiology and Surveillance Branch, Texas Department of State Health Services (DSHS), in collaboration with the Environmental and Injury Epidemiology and Toxicology Branch–DSHS, San Antonio Metropolitan Health District, and Agency for Toxic Substances and Disease Registry–Centers for Disease Control & Prevention updated 'and re-evaluated the occurrence of liver and leukemia cancers in zip codes 78211,78226,78227,78228, and 78237, San Antonio, Texas. Local residents remain concerned about cancer and environmental contaminants in the air and ground water. The TCR evaluated 1995–2001 incidence data (the best available data) and 1993–2002 mortality data for liver/intrahepatic bile duct cancer and leukemia by cell type (acute lymphocytic, chronic lymphocytic, acute myeloid, chronic myeloid, and other categories). Liver/intrahepatic bile duct cancer was only requested for zip codes 78211,78228, and 78237. Incidence data are the best indicator of the occurrence of cancer in an area because they show how many cancers were diagnosed each year and are considered complete (more than 95%) statewide through 2001. Cancer mortality data are used as a supplemental measure and are complete for the entire state through 2002. The rest of this report examines the investigative methods the TCR used, the results of the investigation, recommendations, and general information on cancer risk factors.

Methodology:

According to the National Cancer Institute, a cancer cluster is a greater than expected number of cancers among people who live or work in the same area and who develop or die from the same cancer within a short time of each other. The cancer cluster investigation is the primary tool used by the TCR to investigate the possibility of excess cancer in a community. The cancer cluster investigation is not used to determine that cancer was associated with or caused by environmental or other risk factors. Instead. the cancer cluster investigation is specifically intended to address the question, "Is there an excess of cancer in the area or population of concern?"

The TCR follows guidelines recommended by the Centers for Disease Control and Prevention for investigating cancer clusters.' In order to determine if an excess of cancer is occurring and if further study is recommended, biologic and epidemiologic evidence is considered. Such evidence may include documented exposures; the toxicity of the exposures; plausible routes by which exposures can reach people (ingesting, touching, breathing); the actual amount of exposure to the people which can lead to absorption in the body; the time from exposure to development of cancer; the statistical significance of the findings; the magnitude of the effect observed; risk factors; and the consistency of the findings over time. The occurrence of rare cancers or unlikely cancers in certain age

groups may indicate a cluster needing further study. Because excesses of cancer may occur by chance alone, the role of chance is also considered in the statistical analysis.

If further study is recommended, the TCR will work with the Environmental and Injury Epidemiology and Toxicology Branch–DSHS to determine the feasibility of conducting an epidemiologic study examining the cancer(s) and exposure(s) of concern: If the epidemiologic study is feasible, the final step is to perform an etiologic investigation to see if the cancer can be related to the exposure. Very few cancer cluster investigations in the United States proceed to this stage.

To determine whether a statistically significant excess of cancer existed in the geographic areas of concern, the number of observed cases and deaths was compared to what would be "expected" based on the state cancer rates. Calculating the expected number(s) of cancer cases takes into consideration the race, sex, and ages of people who are diagnosed or die from cancer. This is iinportant because peoples' race, sex, and age all impact cancer rates. If we are trying to determine if there is more or less cancer in a community compared to the rest of the state, we must consider that the difference in cancer rates is not simply due to one of these factors.

The attached Tables 1–10 present the number of observed cases and deaths for males and females, the number of "expected" cases and deaths, the standardized incidence ratio (SIR) or standardized mortality ratio (SMR), and the corresponding 99% confidence interval. The standardized incidence or mortality ratio (SIR, SMR) is simply the number of observed cases or deaths compared to the number of "expected" cases or deaths. When the SIR or SMR of a selected cancer is equal to 1.00, then the number of observed cases or deaths is equal to the expected number of cases or deaths, based on the incidence or mortality in the rest of the state. When the SIR or SMR is less than 1.00, fewer people developed or died of cancer than we would have expected. Conversely, an SIR or SMR greater than 1.00 indicates that more people developed or died of cancer than we would have expected. To determine if an SIR or SMR greater than 1.00 or less than 1.00 is statistically significant or outside the variation likely to be due to chance, confidence intervals are also calculated.

A 99% confidence interval is used for statistical significance and takes the likelihood that the result occurred by chance into account. It also indicates the range in which we would expect the SIR or SMR to fall 99% of the time. If the confidence interval contains a range that includes 1.00, no statistically significant excess of cancer is indicated. The confidence intervals are particularly important when trying to interpret small numbers of cases. If only one or two cases are expected for a particular cancer, then the report of three or four observed cases will result in a very large SIR or SMR. As long as the 99% confidence interval contains 1.00, this indicates that the SIR or SMR is still within the range one might expect and, therefore, not statistically significant.

Results:

The analysis of incidence data for zip code 78211, San Antonio, Texas, from January 1, 1995–December 31,2001, and mortality data from January 1,1993–December 31,2002, showed selected leukemia subtype incidence and mortality to be within normal ranges for

both males and females. Liver cancer mortality showed a statistically significant elevation among males (SMR=2.12). Analysis summaries are presented in Tables 1–2.

During the same time period, the analysis of zip code 78226, San Antonio, Texas, for incidence and mortality data showed selected leukemia subtypes were within normal ranges for both males and females. Analysis summaries are presented in Tables 3–4.

During the same time period, the analysis of zip code 78227, San Antonio, Texas, for incidence and mortality data showed selected leukemia subtypes were within normal ranges for both males and females. Analysis summaries are presented in Tables 5–6.

During the same time period, the analysis of zip code 78228, San Antonio, Texas, for incidence and mortality data showed a statistically significant elevation for liver cancer incidence and mortality among males (SIR=1.76, SMR= 1.61), respectively. The selected leukemia subtypes were within normal ranges for both males and females. Analysis summaries are presented in Tables 7–8.

During the same time period, the analysis of zip code 78237, San Antonio, Texas, for incidence and mortality data showed selected leukemia subtypes were within normal ranges for both males and females. Liver cancer incidence and mortality showed statistically significant elevations among males (SIR=1.74, SMR=2.52), respectively. Analysis summaries are presented in Tables 9–10.

Discussion:

The observed liver and intrahepatic bile duct cancer elevations in zip codes 78211, 78228, and 78237 remain similar to findings in prior analyses conducted since 1998. It is important to note however the potential for problems with cause of death accuracy and liver cancers. Some studies on the quality of cause of death information have found as much as 40–50% of liver cancers reported on death certificates, actually originating in other organs.[2,3]

Like other studies, this cancer cluster investigation had limitations. The number of years of incidence data examined was limited to seven years and did not include data for the most recent years. Ten years of mortality data were examined as a supplemental measure and did include data for one more recent year. Also, cancer incidence data are based on residence at the time of diagnosis. Address data quality issues were identified for Bexar County 1995–2001 cancer incidence data relating to military personnel and unknown place of residence at the time of diagnosis. It is also possible that some residents who may have been exposed and developed cancer no longer lived in the area at the time of diagnosis so were not included in the data. However, it is possible that people with no exposure may have moved into the area and then developed cancer because of other factors. These cases are included in the investigation.

Information on Cancer and Cancer Risk Factors:

Overall, the occurrence of cancer is common, with approximately two out of every five persons alive today predicted to develop some type of cancer in their lifetime. In Texas, as in the United States, cancer is the second leading cause of death, exceeded only by

heart disease. Also, cancer is not one disease, but many different diseases. Different types of cancer are generally thought to have different causes. If a person develops cancer, it is probably not due to one factor but to a combination of factors such as heredity; diet, tobacco use, and other lifestyle factors; infectious agents; chemical exposures; and radiation exposures. Although cancer may impact individuals of all ages, it primarily is a disease of older persons with over one-half of cancer cases and two-thirds of cancer deaths occurring in persons 65 and older. Finally, it takes time for cancer to develop, usually 20 to 40 years. Conditions that have prevailed for only the last 5 or 10 years are unlikely to be related to the current incidence of cancer in a community.

The chances of a person developing cancer as a result of exposure to an environmental contaminant are slight. According-to Richard Doll and Richard Peto, renowned epidemiologists at the University of Oxford, pollution and occupational exposures are estimated to collectively cause 4–6% of all cancer deaths? The Harvard Center for Cancer Prevention estimates 5% of cancer deaths are due to occupational factors, 2% to environmental pollution and 2% to ionizing/ultraviolet radiation.[5] In contrast, the National Cancer Institute estimates that lifestyle factors such as tobacco use and diet cause 50 to 75 percent of cancer deaths.[6] Eating a healthy diet and refraining from tobacco are the best ways to prevent many kinds of cancer.

The occurrence of cancer may vary by race/ethnicity, gender, type of cancer, geographic location, population group, and a variety of other factors. Scientific studies have identified a number of factors for various cancers that may increase an individual's risk of developing a specific type of cancer. These factors are known as risk factors. Some risk factors we can do nothing about, but many are a matter of choice.

Known Risk Factors for Cancers Examined in This Investigation:
The following is a brief discussion summarized fi-om the National Cancer Institute and the American Cancer Society about cancer risk factors for the specific cancers studied in this investigation.[7,8]

Liver and Intrahepatic Bile Duct Cancer
In contrast to many other types of cancer, the number of people who develop liver cancer and die from it is increasing. This cancer is about 10 times more common in developing countries. The risk factors for liver cancer include viral hepatitis, cirrhosis, long-term exposure to aflatoxin, exposure to vinyl chloride and thorium dioxide, older forms of birth control pills, anabolic steroids, arsenic in drinking water, tobacco use, bile duct disease, ulcerative colitis, liver fluke infection, and aging. Chemicals that are possibly associated with bile duct cancer include dioxin, nitrosamines, and polychlorinated biphenyls (PCBs).

Acute Lymphocytic Leukemia
Possible risk factors for ALL include the following: being male, being white, being older than 70 years of age, past treatment with chemotherapy or radiation therapy, exposure to atomic bomb radiation, or having a certain genetic disorder such as Down syndrome.

Chronic Lymphocytic Leukemia
Possible risk factors for CLL include the following: being middle-aged or older, male, or white; a family history of CLL or cancer of the lymph system; having relatives who are Russian Jews or Eastern European Jews; or having exposure to herbicides or insecticides including Agent Orange, an herbicide used during the Vietnam War.

Acute Myeloid Leukemia
Possible risk factors for AML include the following: being male; smoking, especially after age 60; having had treatment with chemotherapy or radiation therapy in the past; having had treatment for childhood ALL in the past; being exposed to atomic bomb radiation or the chemical benzene;' or having a history of a blood disorder such as myelodysplastic syndrome.

Chronic Myeloid Leukemia
Most people with CML have a gene mutation (change) called the Philadelphia chromosome. The Philadelphia chromosome is not passed fi-om parent to child.

For additional information about cancer, visit the "Resources" link on our web site at http://www.dshs.state.tx.us/tcr/.

Questions or comments regarding this investigation may be directed to Ms. Brenda Mokry, Texas Cancer Registry, at 1-800-252-8059 or brenda.mokry@dshs.state.tx.us.

References:

1. Guidelines for Investigating Clusters of Health Events, Centers for Disease Control and Prevention, MMWR 1990; 39 (RR-11): 1-16.
2. Ron E, Carter R, Jablon S, Mabuchi K. Agreement between death certificate and autopsy diagnoses among atomic bomb survivors. Epidemiology 1994;5:45-56.
3. Percy C, Ries LG, Van Holten VD. The accuracy of liver cancer as the underlying cause of death on death certificates. Public Health Rep 1990;105:361-367.
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5. Harvard Center for Cancer Prevention. Harvard Reports on Cancer Prevention. Volume 1: Human Causes of Cancer. http://www.hsph.harvard.edu/cancer/publications/reports/vo11_summary.html
6. National Cancer Institute. 2001 Cancer Progress Report. http://progressreport.cancer.gov/doc.
7. American Cancer Society web site. http://www.cancer.org.
8. National Cancer Institute web site: http://www.nci.nih.gov/.

Table 1

Number of Observed and Expected Cancer Cases and Race Adjusted Standardized Incidence Ratios, Selected Cancers, Zip Code 78211, San Antonio, TX, 1995–2001

Males				
Site	Observed	Expected	SIR	99% CI
Liver and Intrahepatic Bile Duct	12	12.30	0.98	0.40 – 1.96
Acute Lymphocytic Leukemia	5	2.83	1.77	0.38 – 5.01
Chronic Lymphocytic Leukemia	0	1.67	0.00	0.00 – 3.17
Acute Myeloid Leukemia	3	2.81	1.07	0.12 – 3.91
Chronic Myeloid Leukemia	2	1.55	1.29	0.07 – 6.00
Other Leukemia	0	0.74	0.00	0.00 – 7.19
Females				
Site	Observed	Expected	SIR	99% CI
Liver and Intrahepatic Bile Duct	11	6.33	1.74	0.68 – 3.60
Acute Lymphocytic Leukemia	4	2.29	1.74	0.29 – 5.49
Chronic Lymphocytic Leukemia	1	1.10	0.91	0.00 – 6.74
Acute Myeloid Leukemia	4	2.31	1.73	0.29 – 5.44
Chronic Myeloid Leukemia	1	1.13	0.89	0.00 – 6.60
Other Leukemia	2	0.75	2.68	0.14 – 12.44

Note: The SIR (standardized incidence ratio) is defined as the number of observed cases divided by the number of expected cases. The latter is based on race-, sex-, and age-specific cancer incidence rates for Texas during the period 1995–2001. The SIR has been rounded to the second decimal place.

*Significantly higher than expected at the $p < 0.01$ level.
**Significantly lower than expected at the $p < 0.01$ level.

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Table 2

Number of Observed and Expected Cancer Deaths and Race Adjusted Standardized Mortality Ratios, Selected Cancers, Zip Code 78211, San Antonio, TX, 1993–2002

Males				
Site	Observed	Expected	SMR	99% CI
Liver and Intrahepatic Bile Duct	33	15.54	2.12*	1.29 – 3.28
Acute Lymphocytic Leukemia	0	1.37	0.00	0.00 – 3.86
Chronic Lymphocytic Leukemia	1	1.01	0.99	0.00 – 7.36
Acute Myeloid Leukemia	4	2.37	1.69	0.28 – 5.32
Chronic Myeloid Leukemia	1	1.06	0.94	0.00 – 7.00
Other Leukemia	2	2.16	0.93	0.05 – 4.30
Females				
Site	Observed	Expected	SMR	99% CI
Liver and Intrahepatic Bile Duct	17	9.25	1.84	0.89 – 3.33
Acute Lymphocytic Leukemia	1	1.15	0.87	0.00 – 6.47
Chronic Lymphocytic Leukemia	0	0.66	0.00	0.00 – 8.03
Acute Myeloid Leukemia	3	1.95	1.54	0.17 – 5.62
Chronic Myeloid Leukemia	2	0.69	2.90	0.15 – 13.43
Other Leukemia	3	1.83	1.64	0.18 – 6.00

Note: The SMR (standardized mortality ratio) is defined as the number of observed deaths divided by the number of expected deaths. The latter is based on race-, sex-, and age-specific cancer mortality rates for Texas during the period 1993–2002. The SMR has been rounded to the second decimal place.

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Table 3

Number of observed and Expected Cancer Cases and Race Adjusted Standardized Incidence Ratios, Selected Cancers, **Zip Code *78226,*** San Antonio, TX, **1995–2001**

Males				
Site	Observed	Expected	SIR	***99%*** CI
Acute Lymphocytic Leukemia	0	0.81	0.00	0.00 – 6.54
Chronic Lymphocytic Leukemia	0	0.45	0.00	0.00 – 11.83
Acute Myeloid Leukemia	2	0.77	2.59	0.13 – 11.99
Chronic Myeloid Leukemia	2	0.41	4.89	0.25 – 22.69
Other Leukemia	0	0.20	0.00	0.00 – 26.78
Females				
Site	Observed	Expected	SIR	***99%*** CI
Acute Lymphocytic Leukemia	1	0.65	1.55	0.01 – 11.49
Chronic Lymphocytic Leukemia	0	0.27	0.00	0.00 – 19.28
Acute Myeloid Leukemia	0	0.62	0.00	0.00 – 85 1
Chronic Myeloid Leukemia	2	0.29	6.96	0.36 – 32.28
Other Leukemia	0	0.18	0.00	0.00 – 29.10

Note: The SIR (standardized incidence ratio) is defined as the number of observed cases divided by the number of expected cases. The latter is based on race-, sex-, and age-specific cancer incidence rates for Texas during the period 1995–2001. The SIR has been rounded to the second decimal place.

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Table 4

Number of observed and Expected Cancer Deaths and Race Adjusted Standardized Mortality Ratios, Selected Cancers, Zip Code 78226, San Antonio, TX, 1993–2002

Males				
Site	Observed	Expected	SMR	99% CI
Acute Lymphocytic Leukemia	0	0.35	0.00	0.00 – 15.11
Chronic Lymphocytic Leukemia	0	0.27	0.00	0.00 – 19.43
Acute Myeloid Leukemia	1	0.64	1.55	0.01 – 11.54
Chronic Myeloid Leukemia	2	0.27	7.30	0.38 – 33.84
Other Leukemia	0	0.57	0.00	0.00 – 9.33
Females				
Site	Observed	Expected	SMR	99% CI
Acute Lymphocytic Leukemia	0	0.30	0.00	0.00 – 17.48
Chronic Lymphocytic Leukemia	1	0.15	6.54	0.03 – 48.56
Acute Myeloid Leukemia	0	0.52	0.00	0.00 – 10.18
Chronic Myeloid Leukemia	0	0.17	0.00	0.00 – 31.29
Other Leukemia	0	0.45	0.00	0.00 – 11.79

Note: The SMR (standardized mortality ratio) is defined as the number of observed deaths divided by the number of expected deaths. The latter is based on race-, sex-, and age-specific cancer mortality rates for Texas during the period 1993–2002. The SMR has been rounded to the second decimal place.

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Table 5

Number of Observed and Expected Cancer Cases and Race Adjusted Standardized Incidence Ratios, Selected Cancers, Zip Code 78227, San Antonio, TX, 1995–2001

Males				
Site	Observed	Expected	SIR	99% CI
Acute Lymphocytic Leukemia	5	3.80	1.31	0.28 – 3.72
Chronic Lymphocytic Leukemia	4	3.41	1.17	0.20 – 3.69
Acute Myeloid Leukemia	6	4.37	1.37	0.35 – 3.59
Chronic Myeloid Leukemia	2	2.23	0.89	0.05 – 4.15
Other Leukemia	0	1.43	0.00	0.00 – 3.70
Females				
Site	Observed	Expected	SIR	99% CI
Acute Lymphocytic Leukemia	2	2.82	0.71	0.04 – 3.29
Chronic Lymphocytic Leukemia	3	2.30	1.31	0.15 –4.78
Acute Myeloid Leukemia	3	3.48	0.86	0.10 – 3.16
Chronic Myeloid Leukemia	0	1.56	0.00	0.00 – 3.39
Other Leukemia	0	1.18	0.00	0.00 – 4.48

Note: The SIR (standardized incidence ratio) is defined as the number of observed cases divided by the number of expected cases. The latter is based on race-, sex-, and age-specific cancer incidence rates for Texas during the period 1995–2001. The SIR has been rounded to the second decimal place.

*Significantly higher than expected at the $p < 0.01$ level.
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Table 6

Number of Observed and Expected Cancer Deaths and Race Adjusted Standardized Mortality Ratios, Selected Cancers, **Zip Code 78227,** San Antonio, **TX, 1993–2002**

Males				
Site	Observed	Expected	SMR	99% CI
Acute Lymphocytic Leukemia	2	1.89	1.06	0.05 – 4.90
Chronic Lymphocytic Leukemia	6	2.42	2.48	0.64 – 6.48
Acute Myeloid Leukemia	10	4.16	2.40	0.89 – 5.14
Chronic Myeloid Leukemia	5	1.50	3.34	0.72 – 9.45
Other Leukemia	3	3.44	0.87	0.10 – 3.19
Females				
Site	Observed	Expected	SMR	99% CI
Acute Lymphocytic Leukemia	1	1.38	0.72	0.00 – 5.37
Chronic Lymphocytic Leukemia	4	1.42	2.82	0.47 – 8.87
Acute Myeloid Leukemia	3	3.23	0.93	0.10 – 3.40
Chronic Myeloid Leukemia	0	0.94	0.00	0.00 – 5.66
Other Leukemia	0	2.56	0.00	0.00 – 2.07

Note: The SMR (standardized mortality ratio) is defined as the number of observed deaths divided by the number of expected deaths. The latter is based on race-, sex-, and age-specific cancer mortality rates for Texas during the period 1993-2002. The SMR has been rounded to the second decimal place.

*Significantly higher than expected at the $p < 0.01$ level.
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Table 7

Number of **Observed** and Expected Cancer Cases and Race Adjusted Standardized Incidence Ratios, Selected Cancers, **Zip Code** 78228, San Antonio, TX, **1995–2001**

Males				
Site	Observed	Expected	SIR	99% CI
Liver and Intrahepatic Bile Duct	40	22.74	1.76*	1.12 – 2.61
Acute Lymphocytic Leukemia	2	4.80	0.42	0.02 – 1.93
Chronic Lymphocytic Leukemia	8	4.48	1.79	0.57 – 4.15
Acute Myeloid Leukemia	2	6.09	0.33	0.02 – 1.52
Chronic Myeloid Leukemia	2	3.25	0.62	0.03 – 2.85
Other Leukemia	1	2.00	0.50	0.00 – 3.72
Females				
Site	Observed	Expected	SIR	99% CI
Liver and Intrahepatic Bile Duct	14	12.10	1.16	0.51 – 2.22
Acute Lymphocytic Leukemia	3	4.05	0.74	0.08 – 2.71
Chronic Lymphocytic Leukemia	2	3.22	0.62	0.03 – 2.88
Acute Myeloid Leukemia	5	5.14	0.97	0.21 – 2.75
Chronic Myeloid Leukemia	5	2.45	2.04	0.44 – 5.78
Other Leukemia	6	1.94	3.09	0.79 – 8.07

Note: The SIR (standardized incidence ratio) is defined as the number of observed cases divided by the number of expected cases. The latter is based on race-, sex-, and age-specific cancer incidence rates for Texas during the period 1995–2001. The SIR has been rounded to the second decimal place.

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Table 8

Number of observed and Expected Cancer Deaths and Race Adjusted Standardized Mortality Ratios, Selected Cancers, **Zip Code 78228,** San Antonio, **TX, 1993-2002**

Males				
Site	Observed	Expected	SMR	99% CI
Liver and Intrahepatic Bile Duct	47	29.27	1.61*	1.07 – 2.31
Acute Lymphocytic Leukemia	4	2.48	1.61	0.27 – 5.08
Chronic Lymphocytic Leukemia	5	3.20	1.56	0.34 – 4.43
Acute Myeloid Leukemia	4	5.69	0.70	0.12 – 2.21
Chronic Myeloid Leukemia	3	2.26	1.33	0.15 – 4.86
Other Leukemia	6	5.12	1.17	0.30 – 3.06
Females				
Site	Observed	Expected	SMR	99% CI
Liver and Intrahepatic Bile Duct	24	17.96	1.34	0.74 – 2.21
Acute Lymphocytic Leukemia	0	2.17	0.00	0.00 – 2.45
Chronic Lymphocytic Leukemia	2	2.17	0.92	0.05 – 4.27
Acute Myeloid Leukemia	2	4.76	0.42	0.02 – 1.95
Chronic Myeloid Leukemia	3	1.58	1.90	0.21 – 6.95
Other Leukemia	11	4.35	2.53	0.99 – 5.24

Note: The SMR (standardized mortality ratio) is defined as the number of observed deaths divided by the number of expected deaths. The latter is based on race-, sex-, and age-specific cancer mortality rates for Texas during the period 1993–2002. The SMR has been rounded to the second decimal place.

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Table 9

Number of Observed and Expected Cancer Cases and Race Adjusted Standardized Incidence Ratios, Selected Cancers, Zip Code 78237, San Antonio, TX, 1995–2001

Males				
Site	Observed	Expected	SIR	99% CI
Liver and Intrahepatic Bile Duct	28	16.06	1.74*	1.01 – 2.79
Acute Lymphocytic Leukemia	3	3.13	0.96	0.11 – 3.51
Chronic Lymphocytic Leukemia	4	2.14	1.87	0.31 – 5.87
Acute Myeloid Leukemia	3	3.49	0.86	0.10 – 3.15
Chronic Myeloid Leukemia	1	1.93	0.52	0.00 – 3.86
Other Leukemia	2	0.93	2.15	0.11 – 9.97
Females				
Site	Observed	Expected	SIR	99% CI
Liver and Intrahepatic Bile Duct	11	8.79	1.25	0.49 – 2.59
Acute Lymphocytic Leukemia	5	2.65	1.88	0.41 – 5.33
Chronic Lymphocytic Leukemia	0	1.53	0.00	0.00 – 3.46
Acute Myeloid Leukemia	0	2.96	0.00	0.00 – 1.79
Chronic Myeloid Leukemia	0	1.44	0.00	0.00 – 3.68
Other Leukemia	0	1.02	0.00	0.00 – 5.20

Note: The SIR (standardized incidence ratio) is defined as the number of observed cases divided by the number of expected cases. The latter is based on race-, sex-, and age-specific cancer incidence rates for Texas during the period 1995–2001. The SIR has been rounded to the second decimal place.

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Table 10

Number of Observed and Expected Cancer Deaths and Race Adjusted Standardized Mortality Ratios, Selected Cancers, Zip Code 78237, San Antonio, TX, 1993–2002

Males				
Site	Observed	Expected	SMR	99% CI
Liver and Intrahepatic Bile Duct	52	20.64	2.52*	1.71 – 3.57
Acute Lymphocytic Leukemia	1	1.57	0.64	0.00 – 4.75
Chronic Lymphocytic Leukemia	1	1.36	0.74	0.00 – 5.47
Acute Myeloid Leukemia	2	2.93	0.68	0.04 – 3.17
Chronic Myeloid Leukemia	1	1.34	0.74	0.00 – 5.53
Other Leukemia	2	2.76	0.72	0.04 – 3.36
Females				
Site	Observed	Expected	SMR	99% CI
Liver and Intrahepatic Bile Duct	22	13.0	1.70	0.91 – 2.87
Acute Lymphocytic Leukemia	3	1.40	2.15	0.24 – 7.85
Chronic Lymphocytic Leukemia	0	0.99	0.00	0.00 – 5.36
Acute Myeloid Leukemia	2	2.60	0.77	0.04 – 3.56
Chronic Myeloid Leukemia	1	0.91	1.10	0.01 – 8.19
Other Leukemia	2	2.49	0.80	0.04 – 3.72

Note: The SMR (standardized mortality ratio) is defined as the number of observed deaths divided by the number of expected deaths. The latter is based on race-, sex-, and age-specific cancer mortality rates for Texas during the period 1993–2002. The SMR has been rounded to the second decimal place.

*Significantlyhigher than expected at the $p < 0.01$ level.
**Significantly lower than expected at the $p < 0.01$ level.

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